

CLAIMS

We claim:

1. A method for varying an operating band of an antenna, comprising the steps of:
magnetically and electrically coupling at least one antenna element to a fluid dielectric; and
varying a volume of said fluid dielectric coupled to said at least one antenna element to selectively maximize efficiency of said antenna element on a plurality of operating bands.
2. The method according to claim 1 wherein said varying step further comprises controlling said volume to selectively provide an efficient impedance match with an antenna feed circuit of said at least one antenna element for each of said operating bands.
3. The method according to claim 1 wherein said varying step further comprises varying said volume to selectively cause said at least one antenna element to be resonant at said plurality of operating bands.
4. The method according to claim 1 further comprising the step of selecting said fluid dielectric to include magnetic particles.
5. The method according to claim 1 wherein said varying step further comprises varying at least one of a capacitive and a magnetic loading of said at least one antenna element.
6. The method according to claim 1 wherein said coupling step further comprises coupling said fluid dielectric to said at least one antenna element over a continuous area defined by said at least one antenna element.
7. The method according to claim 1 wherein said coupling step further comprises selectively distributing said fluid dielectric to a plurality of separate cavity structures coupled to said at least one antenna element.

8. The method according to claim 7 further comprising the step of distributing said cavity structures about an area defined by said at least one antenna element.
9. The method according to claim 7 further comprising the step of distributing said cavity structures spaced from one another along a direction extending from said at least one antenna element to a ground plane of said antenna element.
10. An antenna, comprising:
 - at least one antenna element;
 - a fluid dielectric magnetically and electrically coupled to said antenna element;
 - and
 - a fluid control system responsive to a control signal for selectively varying a volume of said fluid dielectric coupled to said antenna element, whereby operation of said antenna element is provided on a plurality of operating bands.
11. The antenna according to claim 10 further wherein said antenna element is disposed on a dielectric substrate.
12. The antenna according to claim 11 wherein at least one cavity structure is defined in said dielectric substrate for constraining said fluid dielectric.
13. The antenna according to claim 12 wherein said at least one cavity structure is substantially continuous within an area defined by said at least one antenna element.
14. The antenna according to claim 12 comprising a plurality of said cavity structures.
15. The antenna according to claim 14 wherein said plurality of cavity structures are distributed about an area defined by said at least one antenna element.
16. The antenna according to claim 14 wherein said plurality of cavity structures are spaced from one another along a direction extending from said at least one antenna element to a ground plane of said antenna element.

17. The antenna according to claim 10 wherein said fluid control system comprises a controller and said controller selectively varies said volume to provide an impedance match with an antenna feed circuit of said at least one antenna element for each of said operating bands.

18. The antenna according to claim 10 wherein said fluid control system comprises a controller and said controller selectively varies said volume to cause said at least one antenna element to be resonant at said plurality of operating bands.

19. The antenna according to claim 10 wherein said fluid dielectric is comprised of magnetic particles.

20. The antenna according to claim 10 wherein said fluid control system comprises a controller and said controller selectively varies at least one of a capacitive and a magnetic loading of said at least one antenna element.